

# Rheumatoid Arthritis 2016 Prevalence, Drug Treatment, and Total Medical and Pharmacy Claims Expense in a 15 Million Member Commercially Insured Population

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## Background

- Insurers need to understand what costs occur in excess for members with rheumatoid arthritis (RA) and, of these, which are potentially modifiable by improved drug therapy.
- The total economic RA burden includes direct RA pharmacy and medical care costs, other direct costs, and indirect costs due to work productivity losses.<sup>1,2,3</sup>
- Administrative claims data analyses can be used to estimate the RA prevalence and the RA direct medical and pharmacy costs in insured populations.
- The most recent RA treatment guidelines focus on use of disease-modifying antirheumatic drugs (DMARDs), glucocorticoids, and strategies for sequencing and adjusting therapy with these agents.<sup>4,5</sup>
- DMARDs target inflammation and reduce structural damage. These can be classified into biologic and targeted synthetic agents (b/tsDMARDs), developed to modulate a target involved in inflammation, and conventional synthetic agents (csDMARDs), which evolved empirically and have modes of action that are largely unknown.<sup>6</sup>
- Guidelines recommend use of a "treat-to-target" strategy with frequent evaluation using structured RA disease activity measures to guide treatment adjustments aimed at clinical remission or, if this is not achievable, low disease activity. An international task force has recommended that RA patients with active disease should be re-assessed every few months and those in remission or with low disease activity should be re-assessed about every six months.<sup>7</sup>

## Objective

- To determine in a commercially insured population:
- RA prevalence in 2016 based on medical claims diagnosis coding in four years of claims history; and
  - Total 2016 medical and pharmacy claims expense by categories for RA members stratified by treatment and for all RA members compared with a matched sample of members without RA.

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## Methods

- In 2016, 15 million members were queried to identify those that were continuously enrolled from 2013 through 2016 (four years) and age 18 to 64 years on Dec. 31, 2016. Members were categorized as having RA if:
  - They had two or more medical claims occurring at least two months apart with an RA diagnosis code, and
  - Their total number of different claim dates with an RA diagnosis code was greater than the total number of claims dates for the member for any other autoimmune disease.
- To characterize the population costs associated with RA, a comparison sample of members with no claims with an RA diagnosis code (notRA group) was randomly selected, matched 5:1 with the members with RA by gender, one year age group and health plan.
- All pharmacy and medical claims incurred from 2013 through 2016 were extracted for all members in the RA and notRA groups.
- RA members were stratified into three 2016 drug treatment groups:
  - b/tsDMARD +/- csDMARD**, if they had a 2016 pharmacy or medical claim for etanercept (Enbrel<sup>®</sup>), adalimumab (Humira<sup>®</sup>), abatacept (Orencia<sup>®</sup>), infliximab (Remicade<sup>®</sup> or Inflectra<sup>®</sup>), rituximab (Rituxan<sup>®</sup>) coded for RA, tocilizumab (Actemra<sup>®</sup>), certolizumab (Cimzia<sup>®</sup>), golimumab (Simponi<sup>®</sup> or Simponi Aria<sup>®</sup>), anakinra (Kineret<sup>®</sup>) or tofacitinib (Xeljanz<sup>®</sup>);
  - csDMARD**, only if they had a 2016 pharmacy claim for methotrexate (MTX), hydroxychloroquine (HCQ), sulfasalazine (SSZ), or leflunomide (LEF), but none for a b/tsDMARD;
  - no DMARD**, if they had no 2016 pharmacy or medical claims for a DMARD as defined above.
- All pharmacy claims were categorized by National Drug Codes (NDC) then grouped into simplified categories.
- Medical outpatient claims were categorized by Healthcare Common Procedure Coding System (HCPCS) codes, then grouped into simplified categories by the researcher.
  - Expense for administration of DMARDs was defined as a claim line expense for drug administration incurred on the same dates as medical claims for b/tsDMARDs.
  - Rheumatologist office visits were defined as claims with a procedure code for a problem-focused office visit or consultation with a complexity level of two or higher and the National Provider Identifier (NPI) of a rheumatologist based on the Centers for Medicare & Medicaid Services (CMS) National Plan and Provider Enumeration System (NPPES) registry of NPIs.
- For a fraction of medical claims, the available medical data did not include any NPI values for the servicing provider but only NPI values for the billing provider, which in some cases was a multiple specialty practice. Therefore, pharmacy claim rheumatologist prescriber NPI values were added as a proxy for rheumatologist office visits.
- Medical inpatient facility claims were categorized by Medicare Severity-Diagnosis Related Groups (MS-DRGs) and major diagnostic categories (MDCs). Medical inpatient professional claims were categorized by HCPCS codes.
- Expense is the sum of insurer and member payments (allowed amount) without adjustment for rebates or coupons. Mean total and by-category expense for the RA members minus that for the matched notRA members is reported as excess expense associated with RA.

## Results

- In 2016, there was an average of 13.91 million members per month younger than 65 years, of whom 3.25 million were continuously enrolled from 2013 through 2016 and age 18 to 64 years old.
- Of these 3.25 million, 26,098 were categorized as having an RA diagnosis.
  - Mean age of the RA members was 52.9 years and 76.3% were female
  - RA prevalence per 100,000 members 18 to 64 years old was 741 (0.74%) total, 1,123 (1.12%) of females and 354 (0.35%) of males
- The notRA comparison sample consisted of 130,490 members selected randomly to match the RA members. This sample had a mean age of 52.9 years and 76.3% were female.
- The RA members were categorized by 2016 DMARD therapy as: 8,761 (33.6%) any b/tsDMARD, 9,135 (35.0%) csDMARD only and 8,202 (31.4%) no DMARD. **Table 1** shows other measures for RA members stratified by 2016 drug therapy category and all RA compared to notRA members.
  - Slightly more than half of the b/tsDMARD and csDMARD only groups had 2016 claims for an oral glucocorticoid and about 20% had claims for a joint injection with a glucocorticoid. These fractions were somewhat lower for the no DMARD group.
  - Almost half of RA members in each group had a NSAID claim and almost half had a claim for an opioid analgesic in 2016, compared with about 20% of the matched notRA group for each measure. About two-thirds of the RA members had a 2016 claim for a NSAID or an opioid analgesic, compared with about one-third of the notRA group.
  - 96.7% of the b/tsDMARD and 91.6% of the csDMARD only group had a 2016 office visit and/or pharmacy claim prescribed by a rheumatologist, compared with 31.0% of the no DMARD group.
  - 74.8% of the b/tsDMARD, 69.1% of the csDMARD only, and 32.1% of the no DMARD groups had any 2016 claim for an erythrocyte sedimentation rate (ESR) or C-reactive protein (CRP) laboratory test. The proportion with two or more of these inflammation monitoring tests—the expected finding if they were used to monitor a patient as frequently as recommended—was about 50% of the b/tsDMARD, 40% of the csDMARD only and 10% of the no DMARD groups.
- Members with RA had a mean 2016 per patient per year (PPPY) total medical plus pharmacy cost of \$27,993 compared with \$8,149 PPPY for the matched notRA members. Mean excess cost associated with RA was therefore \$19,845 PPPY. (**Table 2**)
  - 2016 total was \$51,911 PPPY for the b/tsDMARD group, \$15,068 for the csDMARD only group and \$16,841 for the no DMARD group
  - b/tsDMARDs accounted for \$35,896 (69.2%) PPPY of the b/tsDMARD group total costs and 61.3% of the difference in PPPY between all RA and notRA members
- Table 2** shows mean 2016 PPPY cost by categories for RA members stratified by 2016 DMARD therapy categories and for all RA members and matched notRA members. Of the total excess PPPY claims expense for all RA members compared with nonRA members:
  - b/tsDMARDs accounted for 61.3% and csDMARDs for 2.1%;
  - Other medical outpatient accounted for 19.9%, with leading categories being imaging, office visits, musculoskeletal procedures and lab tests;
  - Medical inpatient accounted for 11.0%, with leading categories being musculoskeletal, infection and cardiovascular stays; and
  - Other pharmacy accounted for 7.8%, with leading categories being NSAIDs and opioid analgesics.

**Table 1.** Study Members' 2016 Disease Modifying Antirheumatic Drug (DMARD) Therapy, Other Drug Therapies and Rheumatologist Care

Measure	Rheumatoid Arthritis (RA) Members by 2016 Disease Modifying Antirheumatic Drug (DMARD) Therapy				Matched members without RA <sup>a</sup>
	No DMARD	Conventional synthetic DMARD (csDMARD) only	Biologic/targeted synthetic DMARD (b/tsDMARD) +/- csDMARD	Total with RA	
N study members <sup>c</sup>	8,202	9,135	8,761	26,098	130,490
Total RA members (percent)	31.4%	35.0%	33.6%	100.0%	N/A
Mean age, years, on Dec. 31, 2016	52.3	53.5	52.8	52.9	52.9
Female	73.6%	77.8%	77.3%	76.3%	76.3%
Mean number of dates w/RA Dx, 2013-2016	7.2	14.6	27.9	16.7	N/A
>= 2 RA Dx dates in 2016	29.6%	79.0%	92.7%	68.1%	0.0%
First RA Dx was in 2016	11.2%	14.1%	3.1%	9.5%	0.0%
Any csDMARD, 2013-2016	30.7%	100.0%	84.2%	72.9%	1.0%
Any b/tsDMARD, 2013-2016	8.3%	7.7%	100.0%	38.9%	0.4%
<b>2016 non-DMARD Rx Therapy</b>					
Oral glucocorticoid	33.4%	52.0%	54.9%	47.1%	17.5%
Glucocorticoid joint injection	15.0%	19.0%	23.0%	19.1%	6.1%
NSAID	41.5%	49.1%	47.3%	46.1%	20.0%
Opioid	44.7%	44.0%	50.7%	46.5%	23.4%
NSAID or Opioid	61.6%	66.8%	69.6%	66.1%	33.7%
<b>2016 Rheumatology Care</b>					
Rheumatologist office visit	26.7%	77.7%	84.8%	64.1%	1.8%
Rx prescribed by rheumatologist	21.0%	89.4%	94.2%	69.6%	1.6%
Rheumatologist office visit or Rx	31.0%	91.6%	96.7%	74.3%	2.2%
<b>2016 RA Laboratory Testing</b>					
ESR or CRP test	32.1%	69.1%	74.8%	59.4%	6.3%
>= 2 ESR tests	10.5%	41.9%	51.6%	35.3%	0.8%
>= 2 CRP tests	8.0%	37.1%	47.1%	31.3%	0.7%

N/A = not applicable. csDMARD = conventional synthetic DMARD (see Methods for csDMARD list), b/tsDMARD = biologic (originator or biosimilar) or targeted synthetic DMARD (see Methods for b/tsDMARD list), RA Dx = medical claim with a diagnosis code for RA, NSAID = non-steroidal anti-inflammatory drug, rheumatology office visit = HCPCS code for level 2 complexity or higher problem-oriented office visit with physician specializing in rheumatology, ESR = erythrocyte sedimentation rate, CRP = C-reactive protein.  
<sup>a</sup>Members without RA were matched 5:1 with RA members by gender, one-year age group and health plan.  
<sup>b</sup>All study members, matched members without RA and RA members, were continuously enrolled from 2013 through 2016.

## Conclusions

- RA prevalence.** This study found an overall RA prevalence of about 0.7% of commercially insured members age 18 to 64 years. This agrees with other published studies<sup>8,9,10</sup>
- Total 2016 medical and pharmacy claims expense by categories.** The mean total medical plus pharmacy claims expense for RA members was 3.5 times higher than a matched comparison sample of members without RA. This study looks at the difference in expense by categories between matched members with and without RA to separate out differences that are explained by RA from differences due only to age, gender and health plan.
  - Two-thirds of the higher cost among all RA members in 2016 was due to b/tsDMARDs that were used by 33.6% of all RA members.
  - The findings identify limited opportunities for short-term off-setting medical cost savings from optimized DMARD therapy, since much of the excess expense is for RA medical care management or articular or other damage that has likely accumulated over the course of years and may not be reduced by subsequent anti-inflammatory drug therapy.
  - In this study, RA members using only conventional DMARDs (e.g., methotrexate) had slightly lower medical costs than RA members using biologic DMARDs with or without a conventional DMARD, a finding consistent with randomized controlled trials comparing the cost effectiveness of optimized conventional DMARD therapy (e.g., triple conventional DMARD therapy) to biologic therapy with methotrexate.
- The results suggest the greatest opportunities for reduction in the direct costs of RA may be strategies that optimize therapy with csDMARDs prior to escalating to b/tsDMARDs.

**Table 2.** 2016 Mean Pharmacy and Medical Costs

Expense Category	Mean Claims Expense PPPY, 2016						
	No DMARD n=8,202	csDMARD only n=9,135	b/tsDMARD +/- csDMARD n=8,761	Total with RA n=26,098	Matched members without RA <sup>a</sup> n=130,490	Mean PPPY	Excess for RA <sup>b</sup> % of total excess
<b>DMARDs, total</b>	-	\$717	\$35,896	\$12,301	\$130	\$12,171	61.3%
Pharmacy csDMARDs	-	\$717	\$519	\$425	\$4	\$421	2.1%
Pharmacy b/tsDMARDs	-	-	\$26,817	\$9,002	\$98	\$8,904	44.9%
Medical b/tsDMARDs	-	-	\$8,049	\$2,702	\$26	\$2,676	13.5%
Administration of medical DMARDs	-	-	\$510	\$171	\$2	\$170	0.9%
<b>Pharmacy, excludes DMARDs</b>	<b>\$3,310</b>	<b>\$3,029</b>	<b>\$3,654</b>	<b>\$3,327</b>	<b>\$1,784</b>	<b>\$1,543</b>	<b>7.8%</b>
NSAIDs	\$256	\$286	\$352	\$299	\$76	\$222	1.1%
Opioid analgesics	\$250	\$165	\$278	\$230	\$43	\$186	0.9%
Diabetes	\$393	\$365	\$428	\$395	\$295	\$100	0.5%
Anticonvulsants for neuropathic pain	\$119	\$117	\$142	\$126	\$29	\$97	0.5%
Corticosteroids	\$4	\$4	\$196	\$68	\$3	\$66	0.3%
Asthma & COPD	\$110	\$133	\$144	\$139	\$64	\$66	0.3%
Glucocorticoids	\$18	\$59	\$115	\$65	\$4	\$61	0.3%
Dry eye or mouth	\$38	\$88	\$106	\$78	\$27	\$51	0.3%
Antidepressants	\$87	\$90	\$119	\$99	\$56	\$43	0.2%
Hepatitis C	\$114	\$115	\$74	\$101	\$61	\$40	0.2%
Osteoporosis	\$19	\$40	\$60	\$40	\$11	\$29	0.1%
Antihypertensives	\$89	\$106	\$112	\$103	\$75	\$28	0.1%
Pulmonary hypertension	\$41	\$56	\$37	\$45	\$17	\$28	0.1%
Antibacterial & antifungal	\$50	\$50	\$57	\$52	\$25	\$28	0.1%
Topical anesthetics	\$35	\$28	\$37	\$33	\$10	\$23	0.1%
Infrequently used RA drugs	\$47	\$25	\$23	\$31	\$10	\$21	0.1%
Lipid Regulators	\$97	\$105	\$120	\$108	\$90	\$18	0.1%
All other	\$1,541	\$1,197	\$1,255	\$1,325	\$888	\$436	2.2%
<b>Medical outpatient, excludes DMARDs</b>	<b>\$8,909</b>	<b>\$8,156</b>	<b>\$8,728</b>	<b>\$8,585</b>	<b>\$4,630</b>	<b>\$3,955</b>	<b>19.9%</b>
Diagnostic radiology	\$1,398	\$1,337	\$1,379	\$1,370	\$738	\$633	3.2%
Office visits	\$946	\$1,153	\$1,233	\$1,115	\$534	\$580	2.9%
Musculoskeletal procedures	\$876	\$739	\$881	\$830	\$382	\$447	2.3%
Laboratory tests	\$707	\$795	\$833	\$780	\$366	\$414	2.1%
Immunoglobulin <sup>c</sup>	\$219	\$220	\$279	\$240	\$30	\$209	1.1%
Durable medical equipment	\$307	\$306	\$384	\$333	\$161	\$172	0.9%
Emergency room visits	\$337	\$235	\$256	\$274	\$140	\$134	0.7%
Dialysis	\$214	\$141	\$275	\$209	\$108	\$101	0.5%
All other	\$3,905	\$3,230	\$3,208	\$3,435	\$2,171	\$1,263	6.4%
<b>Medical inpatient</b>	<b>\$4,622</b>	<b>\$3,167</b>	<b>\$3,634</b>	<b>\$3,781</b>	<b>\$1,605</b>	<b>\$2,176</b>	<b>11.0%</b>
Musculoskeletal	\$1,313	\$1,169	\$1,530	\$1,335	\$394	\$941	4.7%
Infection	\$401	\$250	\$362	\$335	\$91	\$244	1.2%
Circulatory system	\$505	\$317	\$290	\$367	\$183	\$184	0.9%
Digestive system	\$438	\$196	\$212	\$277	\$134	\$144	0.7%
Respiratory system	\$176	\$84	\$144	\$133	\$51	\$82	0.4%
All other	\$1,790	\$1,151	\$1,096	\$1,333	\$752	\$581	2.9%
<b>Pharmacy + medical, excluding DMARDs</b>	<b>\$16,841</b>	<b>\$14,352</b>	<b>\$16,015</b>	<b>\$15,692</b>	<b>\$8,019</b>	<b>\$7,674</b>	<b>38.7%</b>
<b>Total pharmacy + medical</b>	<b>\$16,841</b>	<b>\$15,068</b>	<b>\$51,911</b>	<b>\$27,993</b>	<b>\$8,149</b>	<b>\$19,845</b>	<b>100.0%</b>

All study members, matched members without RA and RA members, were continuously enrolled from 2013 through 2016. PPPY = mean claims expense per patient per year, expense-allowed amount paid to the provider (including member share and the net patient cost). DMARD = disease-modifying antirheumatic drug, csDMARD = conventional synthetic DMARD (see Methods for list), b/tsDMARD = biologic (originator or biosimilar) or targeted synthetic DMARD (see Methods for list), NSAID = non-steroidal anti-inflammatory drug, anticonvulsants for neuropathic pain = pregabalin, gabapentin, topiramate, opioid analgesics include combination drugs, infrequently used RA drugs = anakinra (Kineret), rituximab (Rituxan), tocilizumab (Actemra), certolizumab (Cimzia), golimumab (Simponi), golimumab (Simponi Aria), anakinra (Kineret), tofacitinib (Xeljanz).  
<sup>c</sup>Immunoglobulin use defined was by a small number of RA study members who also had a diagnosis of Common Variable Immunodeficiency.  
<sup>d</sup>Members without RA were matched 5:1 with RA members by gender, one-year age group and health plan.  
<sup>e</sup>Excess RA expense as the mean PPPY extra expense per member with RA compared to the matched members without RA.

## Limitations

- As this study relies completely on administrative claims data, some members may be misclassified as carrying a diagnosis of RA and for some members identified as having RA, the RA diagnosis assignment may be inaccurate.
- Physician assistants (PA) and nurse practitioners (NP) account for many DMARD prescriptions and some problem-focused office visits for members with RA. Some of these providers were found, using web searches, to be rheumatology specialists. However, the researcher had no method for consistently assigning PA and NP claims as rheumatology versus another specialty, so the percentage of RA members with a rheumatologist office visit may be underestimated.
- Some providers follow RA using structured disease activity measures that do not incorporate CRP or ESR test results. Therefore, the study may underestimate the percentage of members with RA whose disease activity is regularly assessed.

## References

- Frankle LC, Ament AJ, van de Laar MA, et al. Cost-of-illness of rheumatoid arthritis and ankylosing spondylitis. *Clinical & Experimental Rheumatology* 2009;27:101-108.
- Eriksson JK, Johansson K, Askling J, et al. Costs for hospital care, drugs and lost work days in incident and prevalent rheumatoid arthritis: how large, and how are they distributed? *Annals of the Rheumatic Diseases* 2015;74:648-654.
- National Rheumatoid Arthritis Society. The burden of rheumatoid arthritis across Europe: a socioeconomic survey (BRASS). *Summary Report*; April 2017. accessed at: [http://www.nras.org.uk/data/files/Publications/Surveys%20Reports/UoC\\_HCD\\_BRASS%20Summary%20Report%20FINAL.pdf](http://www.nras.org.uk/data/files/Publications/Surveys%20Reports/UoC_HCD_BRASS%20Summary%20Report%20FINAL.pdf).
- Singh JA, Saag KG, Bridges SL, Jr., et al. 2015 American College of Rheumatology Guideline for the Treatment of Rheumatoid Arthritis. *Arthritis & Rheumatology* 2016; 68:1-26.
- Smolen JS, Landewe R, Bijlsma J, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs: 2016 update. *Annals of the Rheumatic Diseases* 2017; 76:596-977.
- Smolen JS, Aletaha D, McInnes IB, et al. Rheumatoid arthritis. *Lancet* 2016;388:2023-2038.
- Smolen JS, Breedveld FC, Burmester GR, et al. Treating rheumatoid arthritis to target: 2014 update of the recommendations of an international task force. *Ann Rheum Dis* 2016;75:3-15.
- Myasoedova E, Crowson CS, Kremers HM, et al. The incidence of rheumatoid arthritis rising?: results from Olmsted County, Minnesota, 1955-2007. *Arthritis Rheum* 2010; 62:1576-1582.
- Sacks JJ, Luo Y, Helmsick CG. Prevalence of specific types of arthritis and other rheumatic conditions in the ambulatory health care system in the United States, 2001-2005. *Arthritis Care Res* 2010; 62(4):460-464.
- Crane MM, Juneja M, Allen J, et al. Epidemiology and Treatment of New-Onset and Established Rheumatoid Arthritis in an Insured US Population. *Arthritis care & research* 2015;67:1646-1655.